

Art Unit: 4152

### DETAILED ACTION

1. Applicant's election with traverse of Group I in the reply filed on September 29, 2008 is acknowledged. The traversal is on the grounds that there is no undue burden in examining both the group I and group II claims. Applicants further argue that the groups of claims are not so unrelated as would require a burdened beyond that of the normal burdens of examination. This argument has been considered, but not found persuasive. MPEP § 808.02 recites that for the purposes of the initial requirement of a restriction, a serious burden on the examiner may be prima facie shown if the examiner shows by appropriate explanation either separate classification, separate status in the art, or a different field of search as defined in MPEP § 808.02. Since the Examiner has shown a different classification for the two groups of claims, a burden for examining both groups has been shown. The requirement is still deemed proper and is therefore made FINAL.

### *Claim Objections*

2. **Claim 6** is objected to because of the following informalities: The instant claim is written in the Markush style, however it is vague as to whether the organic group is meant as:
  - a. an alkyl group and amine, thiol, or nitrile function.
  - b. an alkyl group, amine, thiol, or nitrileAppropriate correction is required.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 4152

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-11 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by**

**Shiratsuchi (US Patent No. 5,856,379).**

**(Claims 1-3)** Shiratsuchi teaches a dissymmetric particle of nanometric or mesoscopic size that has an inorganic part consisting comprised of a material A an organic part consisting comprised of a material B characterized in that wherein (*'379, Abstract*):

- a. **(Claims 1 and 3)** the inorganic material A is a mineral oxide or a metal chosen from silica and alumina (*'379, silica, alumina, Col 5, lines 32-37*);
- b. the organic material B is a polymer consisting comprised of recurrent units derived from a vinyl compound (*'379, vinyl, Col 4, lines 26-27; vinyl monomers, Col 9, lines 6-63*) that is substantially spherical in shape (*'379, Fig. 2; Table 1, Col 11, lines 30 – 60*). The Examiner notes that the particle taught by Shiratsuchi has a diameter, and is thus inherently spherical in shape.
- c. the two parts are bound by physicochemical or covalent interactions (*'379, composite particles...reaction operation of coupling reacting silica and vinyl monomer, Col 3, lines 49-59*)
- d. **(Claims 1 and 2)** the size of each of the parts is between 5 nm and 1 micrometer.  
  
Shiratsuchi teaches particle sizes of the composite particles are from 5 nm to 1 micrometer (*'379, Col 4, lines 12-13*), therefore the size of each of the parts is inherently between 5 nm to 1 micrometer, and with respect to **Claim 2**, Shiratsuchi

Art Unit: 4152

thus teaches a dissymmetric particle wherein its size is between 1 nm and 1 micrometer (*'379, Col 4, lines 12-13*).

**(Claims 4-6)** Shiratsuchi discloses the particle of Claim 3 (see above), wherein the inorganic material A is a metal chosen from metals that are stable in an aqueous medium.

Shiratsuchi teaches that the inorganic material is:

- a. **(Claims 4 and 5)** surface modified with an organic group **(Claim 5)** such as an organoalkoxysilane so as to provide excellent dispersion stability in aqueous solution (*Col 5, lines 38-50 and Col 6, lines 30-39, respectively*)
- b. **(Claim 6)** wherein the organic group contains an alkyl group and amine or thiol functions (*'379, organoalkoxysilane modified silica wherein the organoalkoxysilane may contain alkyl groups and amine or thiol [mercapto], Col 5 lines 51-67 through Col 6 lines 1-9*)

**(Claims 7-9)** Shiratsuchi discloses the particle of Claim 1 wherein the polymer is comprised of recurrent units derived from a vinyl compound (see above). Shiratsuchi teaches that the preferred vinyl monomers used in the polymerization are "acrylic acid esters or methacrylic acid esters" (*'379, Col 9, lines 60-61*) but that the "vinyl monomer may contain a polyfunctional monomer having 2 or more unsaturated groups other than the vinyl monomer described above" (*'379, Col 9, lines 64-66*) wherein the preferred polyfunctional vinyl monomers are "divinylbenzene and ethylene glycol dimethacrylate" (*'379, Col 10, lines 21-23*). Therefore, Shiratsuchi teaches the polymer comprising R and R' of the instant **Claim 7** and that the alkyl or

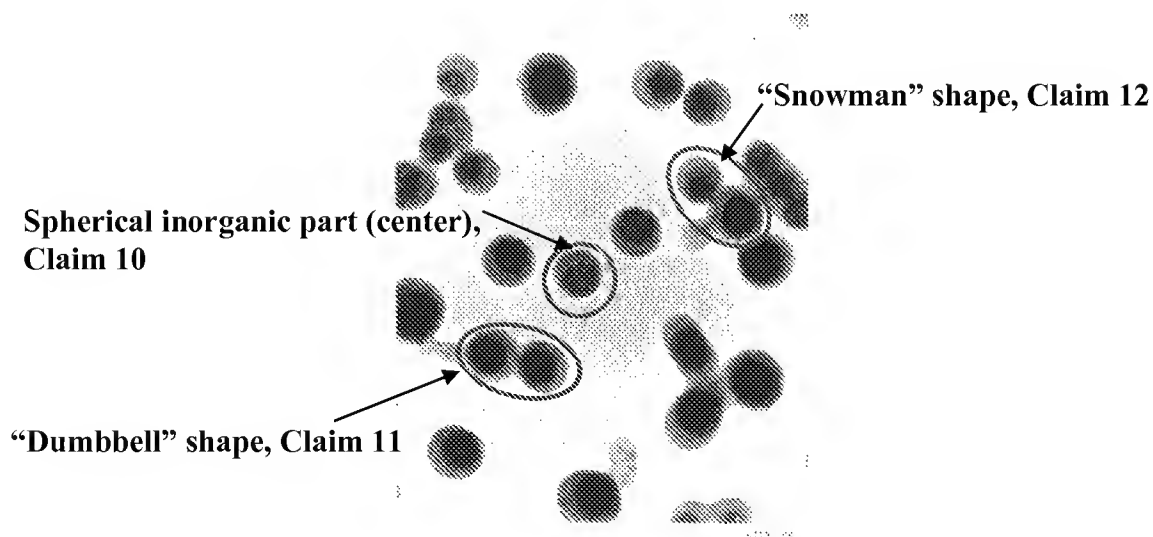
Art Unit: 4152

aryl group bears a functional group (**Claim 8**). With respect to **Claim 9**, Shiratsuchi teaches that the polymer is crosslinked, co-polymer, hence crosslinked, of styrene/divinylbenzene ('379, Col 12, Table 1(2), styrene/divinylbenzene Example P-17) or noncrosslinked, polymer of styrene ('379, Col 12, Table 1(2), styrene, Example P-4).

**(Claim 10)** Shiratsuchi discloses the particle of Claim 1, wherein the inorganic part has the shape of a sphere ('379, Fig. 2, dark center spherical cores, see below).

**(Claim 11)** Shiratsuchi discloses the particle of Claim 10 (see above), wherein it has the shape of a dumbbell, the organic and inorganic parts having substantially the same size ('379, Fig. 2, lower left quadrant, particle shaped like dumbbell, see below).

**(Claim 12)** Shiratsuchi discloses the particle of Claim 10 (see above), wherein it has the shape of a snowman, the inorganic part having a size that is clearly different from the organic part ('379, Fig. 2, upper right quadrant, particle shaped like snowman, see below).



Shiratsuchi et al. US

Fig. 2

Art Unit: 4152

**(Claim 14)** Shiratsuchi discloses the particle of Claim 1, wherein the inorganic material is silica ('379, *Abstract*; *Col 5, line 32*; *Col 11, Table 1(1), Examples, component (1) – colloidal silica*). Shiratsuchi further teaches synthesis examples wherein the monomers of Table 1(2) ('379, *Col 12*) are polymerized and thus disclose that the organic material B is a polystyrene or a copolymer of styrene and of divinylbenzene ('379, *Col 12, Table 1(2), 85/15 styrene/divinylbenzene Example P-17; styrene, Example P-4*).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

Art Unit: 4152

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**8. Claims 13 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiratsuchi (US Patent No. 5,856,379) in view of Eriyama (US Patent No. 6,160,067 A).**

**(Claim 13)** Shiratsuchi discloses the particle of Claim 1 (see above).

Shiratsuchi fails to teach that the inorganic part has the shape of an ellipse, of a disk, of a block or of a rod.

However, Eriyama discloses an inorganic material, silica, that has a polymerizable organic compound chemically bonded to the silica particle via a silyloxy group, wherein the inorganic material can have the shape of a rod, plate (ellips or disk), fibrous, or amorphous ('067, *Col 10, lines 59-61*).

Shiratsuchi discloses the claimed invention except for additional types of shapes for the inorganic part. At the time of the invention, it would have been obvious to one of ordinary skill in the art, to modify the particle taught by Shiratsuchi with the shapes of the inorganic material taught by Eriyama because the shape of the particles determines the physical properties of the material made from the particles, such as a coating film or particle for a chromatographic column bed ('067, *Col 11, lines 1-2, the use of colloidal silica is preferred when transparency of films is pursued*). Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a specific shape of the inorganic part, since it has been

Art Unit: 4152

held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious engineering choice. *In re Leshin*, 125 USPQ 416.

**(Claim 39)** Shiratsuchi discloses the particle of Claim 1 (see above).

Shiratsuchi fails to teach that the size of each of the parts is between 50 nm and 250 nm. However, Shiratsuchi teaches that the average particle size (total) is from 5 nm to 1 micrometer, preferably from 10 nm to 500 nm (*'379, Col 11, lines 18-21*). Therefore, Shiratsuchi teaches that each of the parts is substantially close to the range of the instant claim and it therefore would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the size of each of the parts, particularly through optimization of polymerization conditions, since such a modification would have involved a mere change in the size of a component and one of ordinary skill would have expected compositions that are in such close proportions to those in prior art to be prima facie obvious, and to have same properties. *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 569 U.S. 830, 225 USPQ 232 (1984); *Titanium Metals Corp.*, 227 USPQ 773 (CA FC 1985).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Matyjaszewski et al. (US Publication 2002/0106513 A1) teaches a nanocomposite inorganic-organic particle with silica and vinyl.

Art Unit: 4152

- b. Labarre (US Patent No. 5,718,907) teaches silica particles modified to bind to organic substrates
- c. Pinnavaia et al. (US Publication 2003/0054948 A1) teaches mesostructured organofunctionalized silica compositions.
- d. Sanchez et al. (*Chem. Mater.*, 2001, 13: 3061-3083) discloses the formation of inorganic-organic hybrid nanoparticles.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to APRIL C. INYARD whose telephone number is (571) 270-1245.

The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Del Sole can be reached on (571) 272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/APRIL C INYARD/  
Examiner, Art Unit 4152

/Jennifer McNeil/  
Supervisory Patent Examiner, Art Unit 4162